

Fig. 1

Fig.2

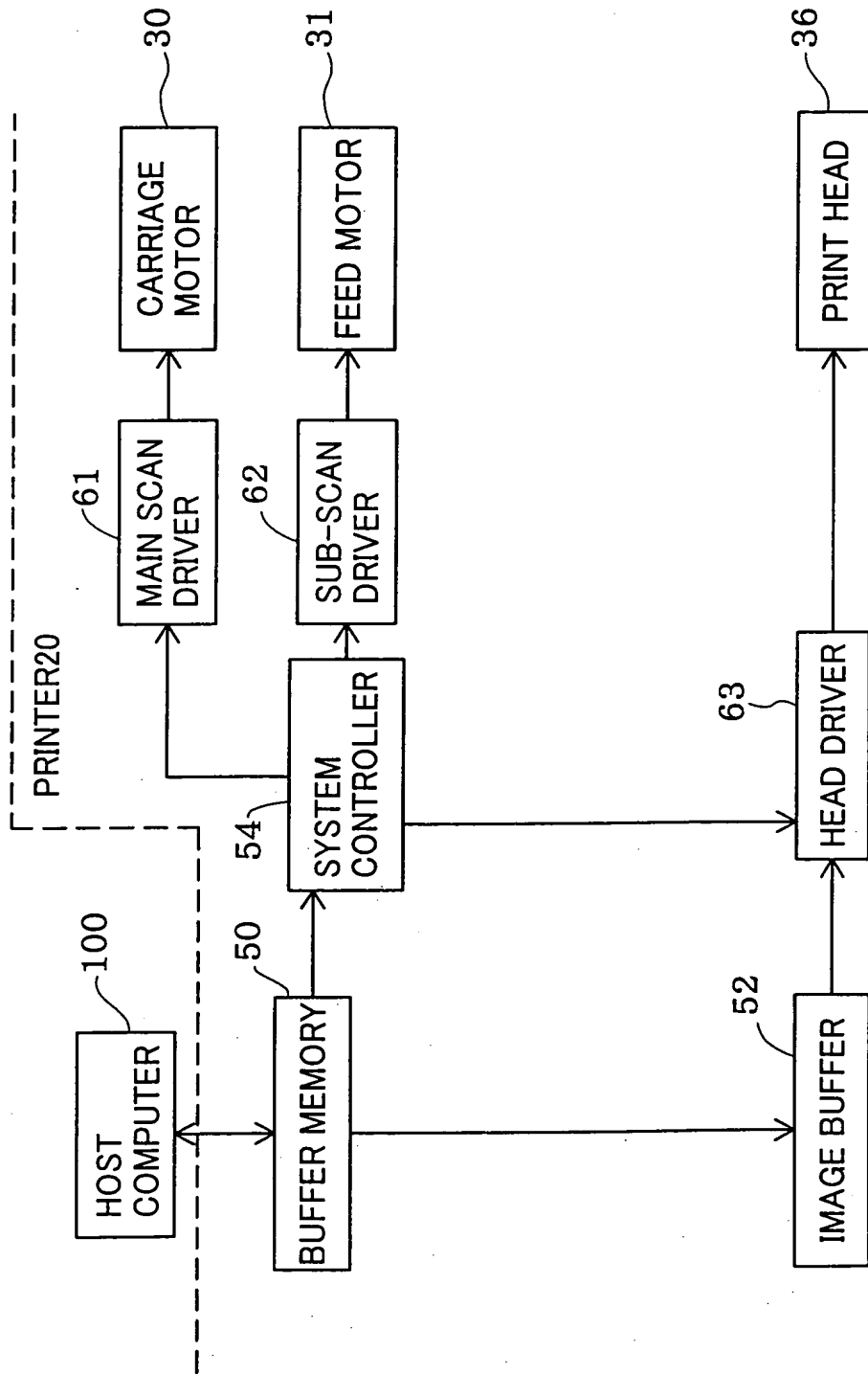


Fig. 3

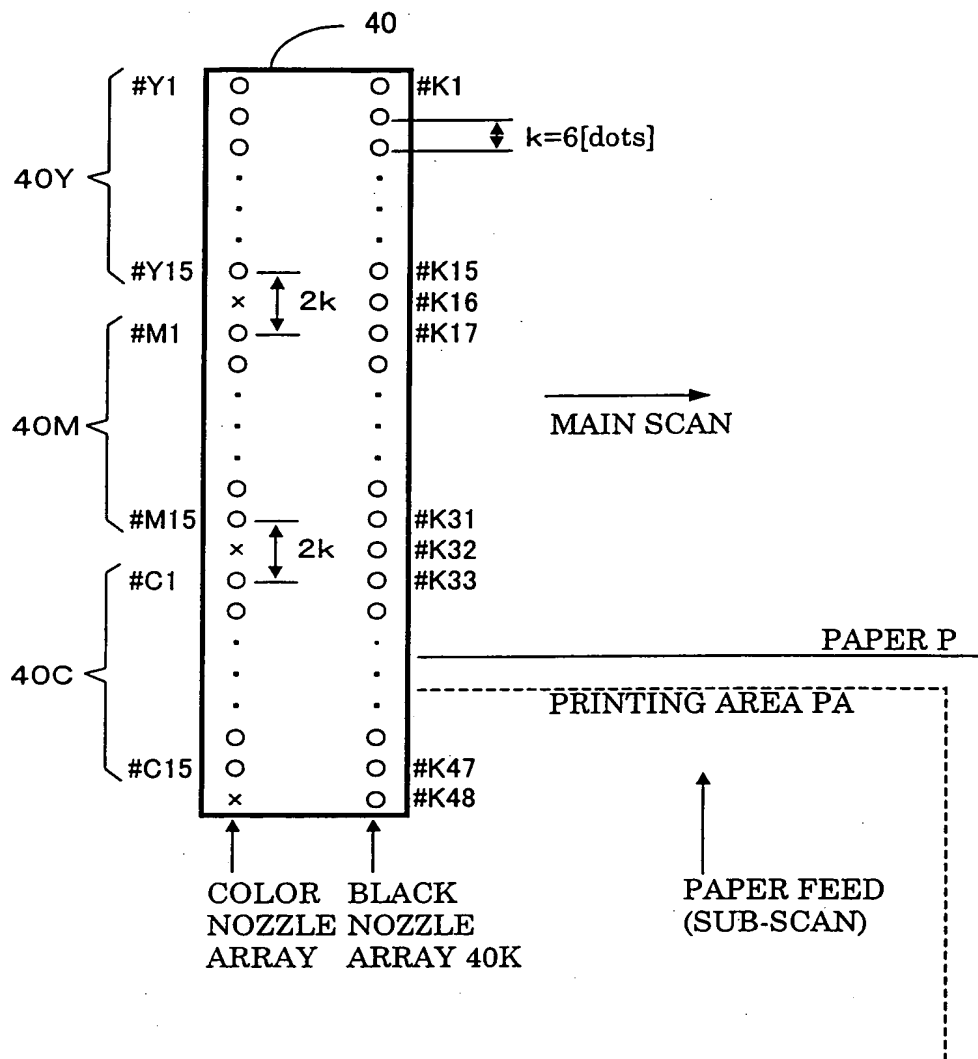


Fig. 4 (A) CONCEPT OF SUB-SCAN FEED( $s=1$ )

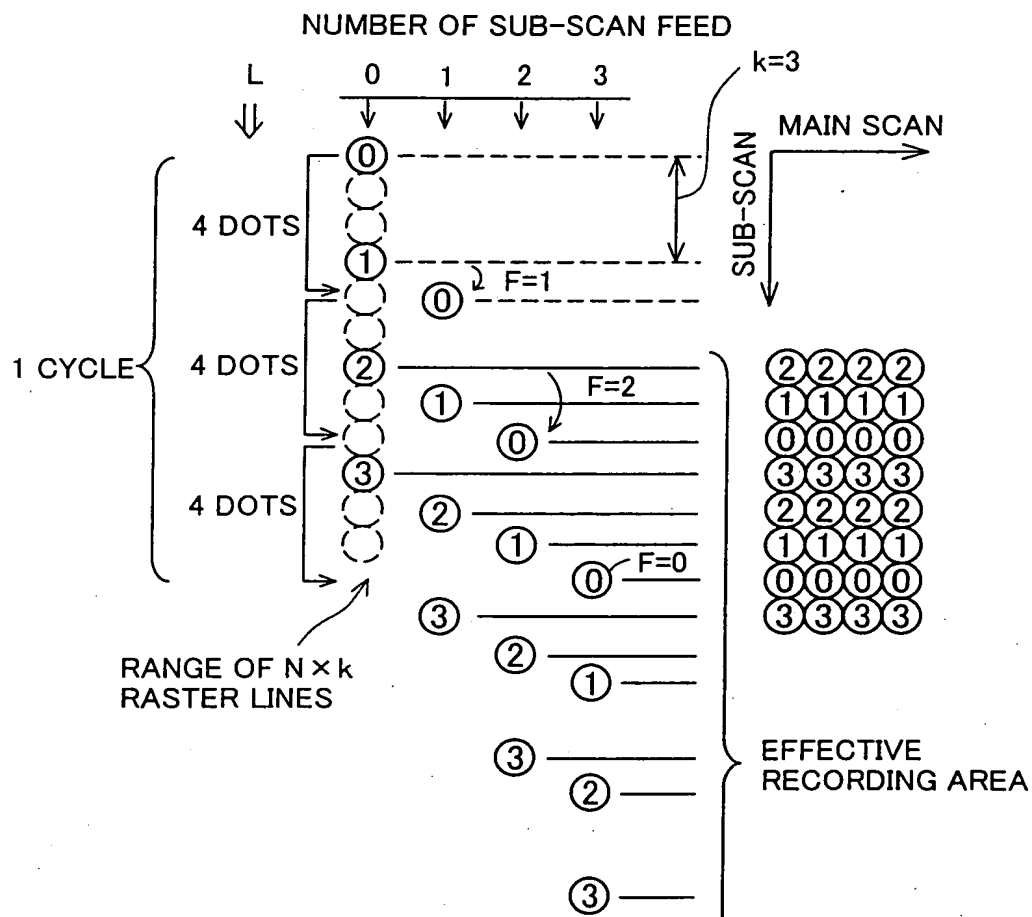


Fig. 4 (B) PARAMETERS

NOZZLE PITCH  $k$  : 3 [dot]  
 NUMBER OF USED NOZZLES  $N$  : 4  
 NUMBER OF SCAN REPEATS  $s$  : 1  
 NUMBER OF EFFECTIVE NOZZLES  $N_{eff}$  : 4

NUMBER OF SUB-SCAN FEED	0	1	2	3
FEED AMOUNT $L$ [dot]	0	4	4	4
$\Sigma L$	0	4	8	12
$F = (\Sigma L) \% k$	0	1	2	0

Fig. 5 (A) CONCEPT OF SUB-SCAN FEED(s=2)

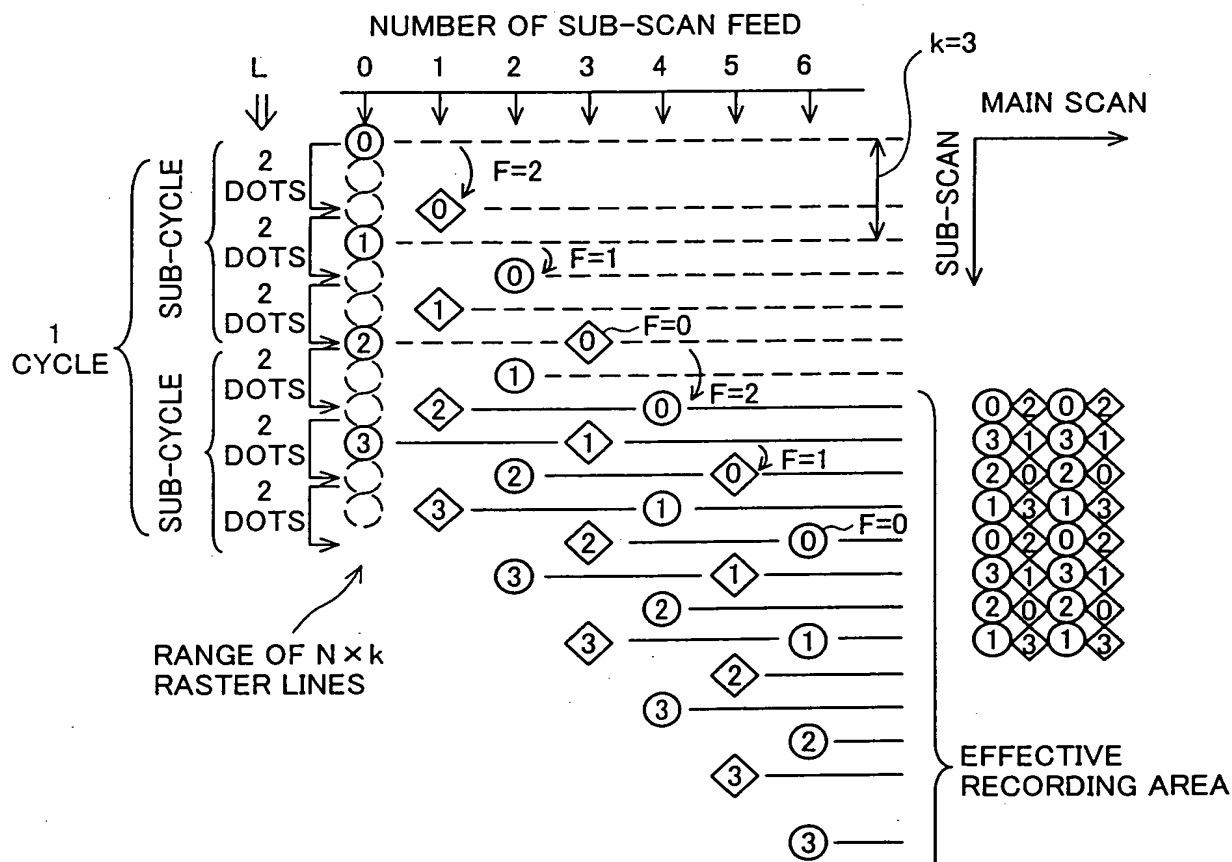


Fig. 5 (B) PARAMETERS

NOZZLE PITCH k : 3 [dot]  
 NUMBER OF USED NOZZLES N : 4  
 NUMBER OF SCAN REPEATS s : 2  
 NUMBER OF EFFECTIVE NOZZLES Neff : 2

NUMBER OF SUB-SCAN FEED	0	1	2	3	4	5	6
FEED AMOUNT L [dot]	0	2	2	2	2	2	2
$\sum L$	0	2	4	6	8	10	12
$F = (\sum L) \% k$	0	2	1	0	2	1	0

Fig. 6

SCAN PARAMETERS IN FIRST EMBODIMENT

Nozzle pitch :  $k = 6$  [dots]

Number of scan repeats :  $s = 1$

Number of working nozzles :  $N = 13$

Number of effective nozzles :  $N_{eff} = 13$

PASS No.	1	2	3	4	5	6	7
SUB-SCAN No.	0	1	2	3	4	5	6
FEED L [dots]	0	13	13	13	13	13	13
$\Sigma L$	0	13	26	39	52	65	78
$F = (\Sigma L) \% k$	0	1	2	3	4	5	0

Fig. 7

WORKING NOZZLES IN FIRST EMBODIMENT

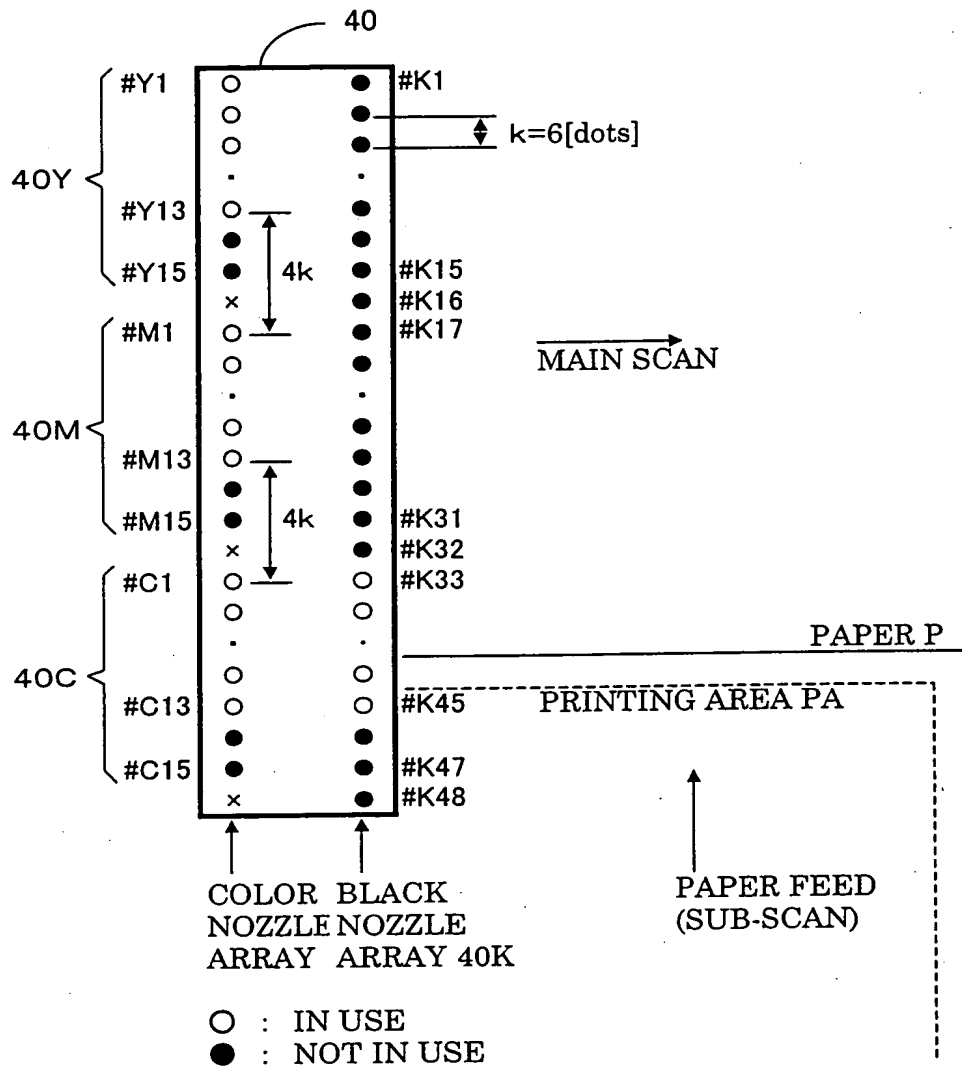


Fig. 8

FIRST EMBODIMENT

RASTER

LINE

PASS No.

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	C11						M1						M1					Y4	
2		C9					M12											Y2	
3			C7					M10							Y13				
4				C5					M8						Y11				
5					C3					M6						Y9			
6						C1					M4						Y7		Cmis
7	C12												M2					Y5	Mmis
8		C10						M13						x				Y3	
9			C8						M11									Y1	Ymis
10				C6						M9					Y12				
11					C4						M7					Y10			
12						C2						M5					Y8		Cmis
13	C13						x						M3					Y6	
14		C11												M1				Y4	Mmis
15			C9						M12									Y2	Ymis
16				C7						M10					Y13				
17					C5						M8					Y11			
18						C3						M6					Y9		
19							C1						M4					Y7	
20		C12											M2					Y5	
21			C10						M13					x				Y3	
22				C8						M11									Y1
23					C6						M9					Y12			
24						C4						M7					Y10		
25							C2						M5					Y8	
26		C13						x						M3				Y6	
27			C11							M12					M1			Y4	
28				C9							M10							Y2	
29					C7							M8				Y13			
30						C5							M6				Y11		
31							C3							M4				Y9	
32								C1							M2			Y7	
33		C12								M13						x			Y5
34			C10								M11								Y3
35				C8							M9						Y12		Y1
36					C6							M7						Y10	
37						C4							M5					Y8	
38							C2												
39		C13						x						M3				Y6	
40			C11												M1			Y4	



### WORKING NOZZLES IN FIRST COMPARATIVE EXAMPLE

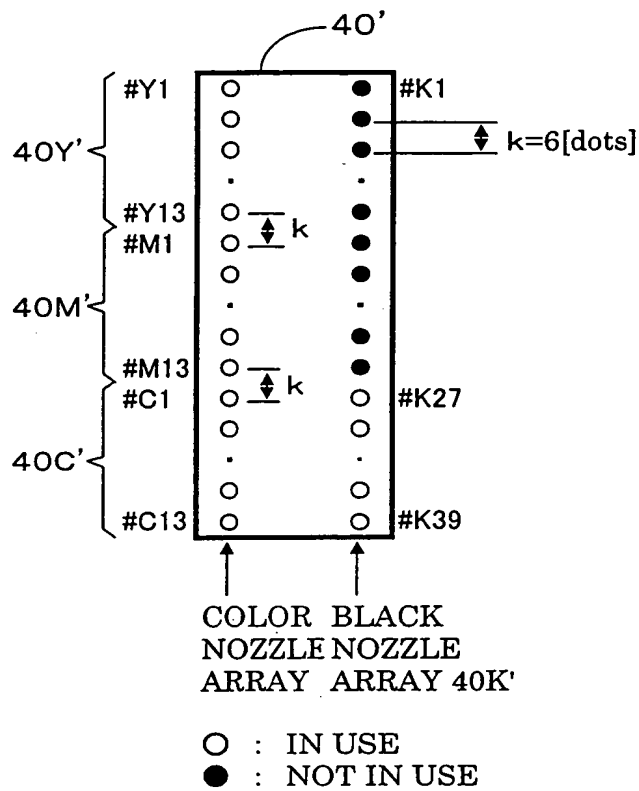


Fig. 10

FIRST COMPARATIVE EXAMPLE

RASTER  
 LINE

PASS No.

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	C11					M11						Y11							
2		C9					M9						Y9						
3			C7					M7						Y7					
4				C5					M5						Y5				
5					C3					M3						Y3			
6						C1					M1						Y1	Cmis, Mmis, Ymis	
7	C12						M12					Y12							
8		C10						M10					Y10						
9			C8						M8					Y8					
10				C6						M6					Y6				
11					C4						M4					Y4			
12						C2						M2					Y2	Cmis, Mmis, Ymis	
13	C13						M13						Y13						
14		C11						M11					Y11						
15			C9						M9					Y9					
16				C7						M7					Y7				
17					C5						M5					Y5			
18						C3						M3					Y3		
19							C1						M1					Y1	
20		C12						M12					Y12						
21			C10						M10					Y10					
22				C8						M8					Y8				
23					C6						M6					Y6			
24						C4						M4					Y4		
25							C2						M2					Y2	
26		C13						M13						Y13					
27			C11						M11					Y11					
28				C9						M9					Y9				
29					C7						M7					Y7			
30						C5						M5					Y5		
31							C3						M3					Y3	
32								C1						M1					Y1
33		C12							M12						Y12				
34			C10							M10						Y10			
35				C8							M8						Y8		
36					C6							M6						Y6	
37						C4							M4						Y4
38							C2							M2					Y2
39		C13							M13						Y13				
40			C11							M11						Y11			

Fig. 11

EQUIVALENT NOZZLE POSITIONING

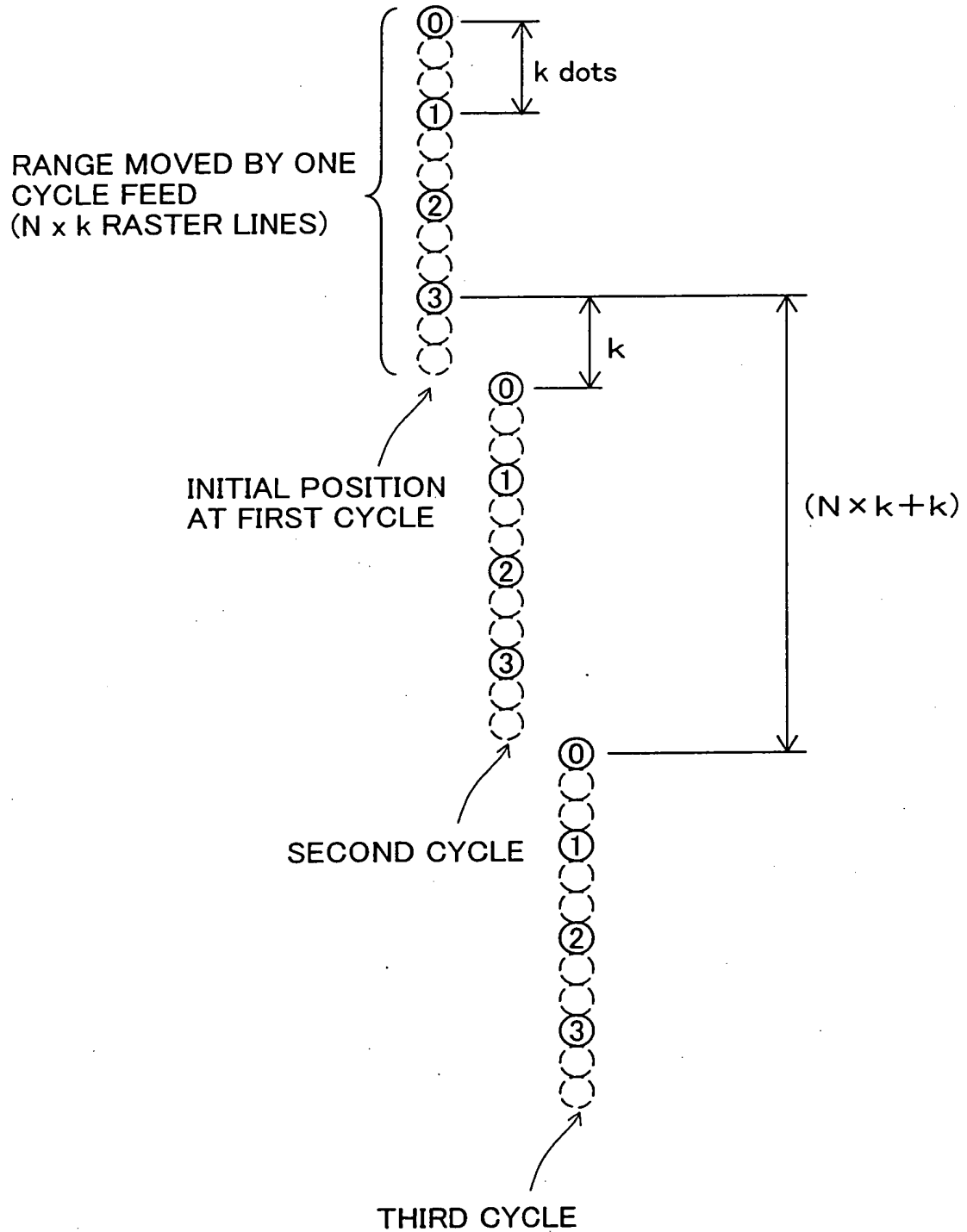


Fig. 12

SCAN PARAMETERS IN SECOND EMBODIMENT

Nozzle pitch :  $k = 6$  [dots]

Number of scan repeats :  $s = 1$

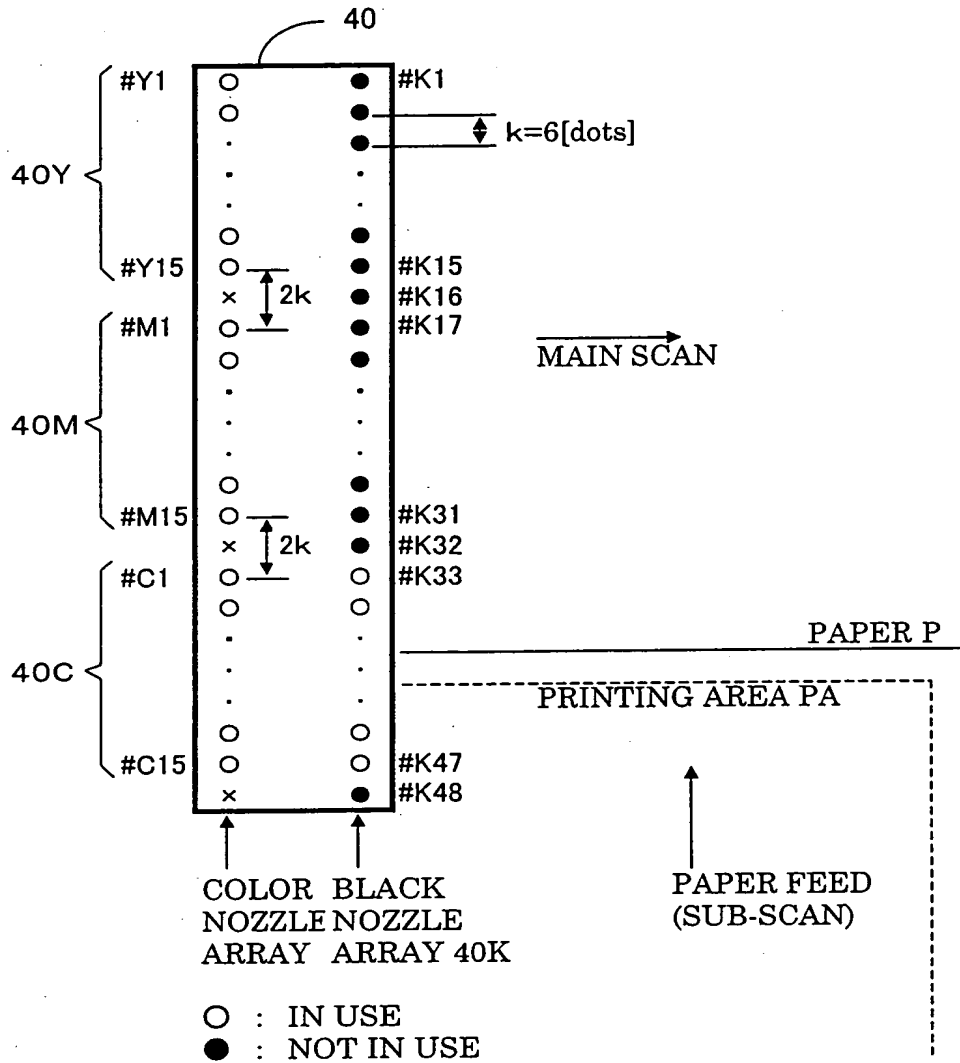
Number of working nozzles :  $N = 15$

Number of effective nozzles :  $N_{eff} = 15$

PASS No.	1	2	3	4	5	6	7
SUB-SCAN No.	0	1	2	3	4	5	6
FEED L [dots]	0	14	15	16	16	15	14
$\Sigma L$	0	14	29	45	61	76	90
$F = (\Sigma L) \% k$	0	2	5	3	1	4	0

Fig. 13

WORKING NOZZLES IN SECOND EMBODIMENT



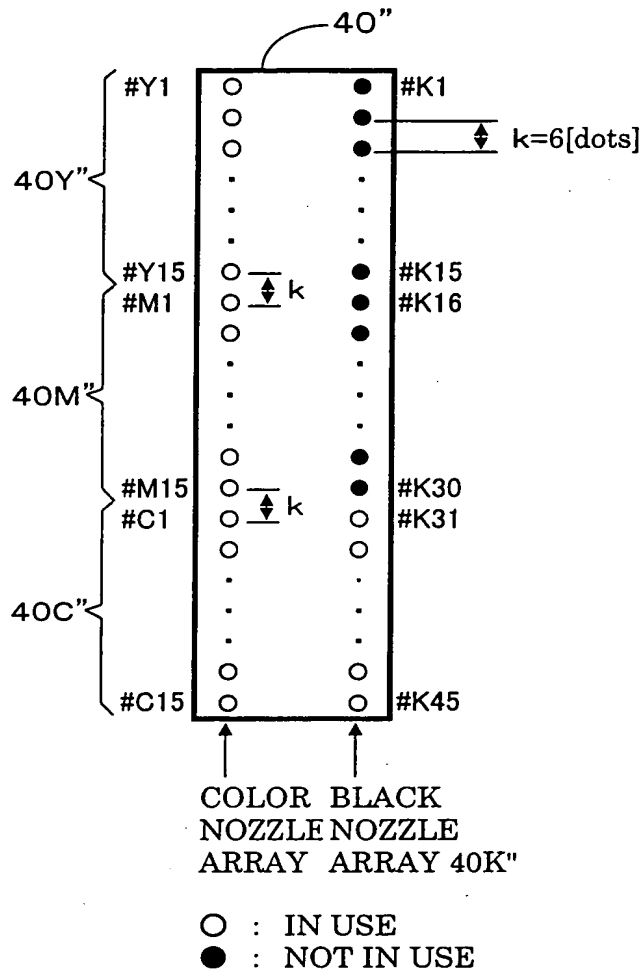
RASTER  
LINE

PASS No.

LINE No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1			C8					M9							Y10				
2	C13						M14						Y15						Cmis, Mmis, Ymis
3				C3						M4							Y5		
4		C11					M12						Y13						
5				C6					M7							Y8			
6						C1					M2							Y3	
7			C9					M10							Y11				Ymis
8	C14						M15						x					Y1	Cmis, Mmis
9				C4						M5						Y6			
10		C12					M13						Y14						
11				C7					M8							Y9			
12					C2						M3							Y4	
13			C10					M11						Y12					Mmis, Ymis
14	C15						x						M1						Y2
15				C5						M6						Y7			
16		C13					M14						Y15						
17				C8					M9							Y10			
18					C3						M4							Y5	
19			C11					M12						Y13					Cmis, Mmis, Ymis
20					C1							M2						Y3	
21				C6						M7							Y8		
22		C14					M15						x					Y1	
23				C9					M10							Y11			
24					C4						M5							Y6	
25			C12					M13						Y14					
26					C2							M3						Y4	
27				C7						M8							Y9		
28		C15					x							M1					Y2
29			C10					M11							Y12				
30				C5						M6							Y7		
31			C13					M14						Y15					
32					C3							M4						Y5	
33				C8						M9						Y10			

Fig. 15

WORKING NOZZLES IN SECOND COMPARATIVE EXAMPLE



RASTER  
LINE

## PASS No.

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1			C8						M8						Y8				
2	C13						M13						Y13					Cmis, Mmis, Ymis	
3					C3						M3							Y3	
4		C11						M11						Y11					
5				C6						M6						Y6			
6						C1						M1						Y1	
7			C9						M9						Y9				
8	C14						M14						Y14					Cmis, Mmis, Ymis	
9					C4						M4							Y4	
10		C12						M12						Y12					
11				C7						M7						Y7			
12						C2						M2						Y2	
13			C10						M10						Y10				
14	C15						M15						Y15					Cmis, Mmis, Ymis	
15					C5						M5							Y5	
16	C13							M13						Y13					
17			C8							M8						Y8			
18					C3							M3						Y3	
19		C11						M11						Y11					
20						C1							M1					Y1	
21				C6							M6						Y6		
22	C14							M14						Y14					
23			C9							M9						Y9			
24					C4							M4						Y4	
25		C12						M12						Y12					
26						C2						M2						Y2	
27				C7							M7							Y7	
28	C15							M15						Y15					
29			C10							M10						Y10			
30					C5							M5						Y5	
31		C13							M13						Y13				
32						C3							M3					Y3	
33				C8								M8					Y8		
34							C1							M1					Y1
35			C11						M11						Y11				
36					C6							M6						Y6	
37	C14								M14						Y14				
38						C4							M4						Y4
39				C9							M9							Y9	
40							C2							M2					Y2



Fig. 17

FIRST ACTUATOR VARIATION

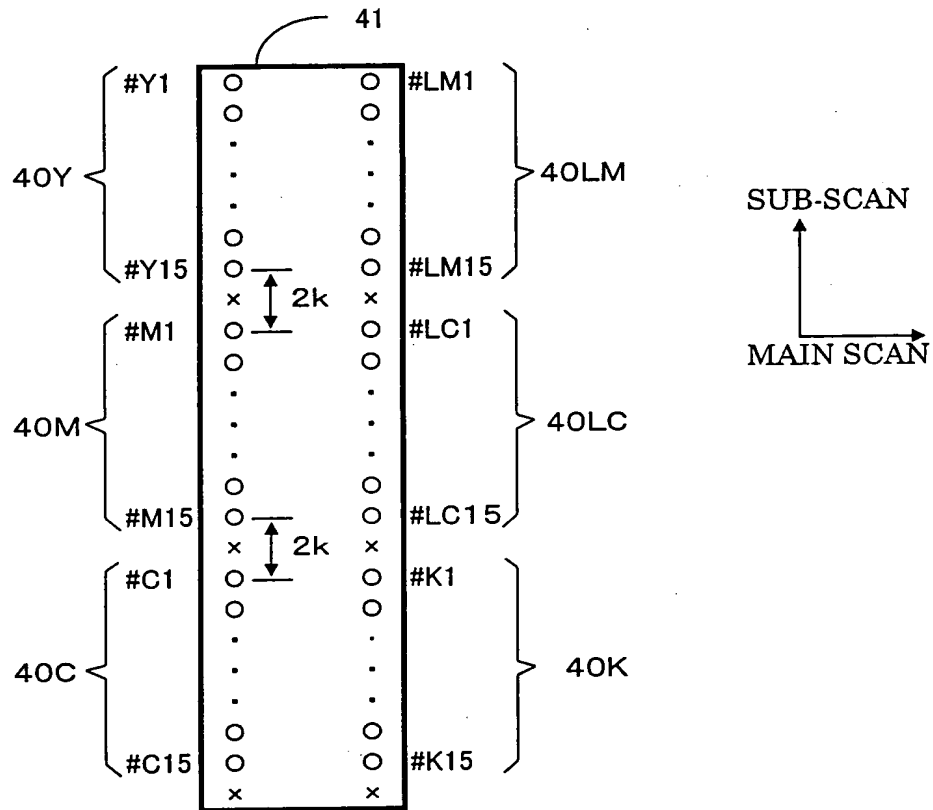


Fig. 18

SECOND ACTUATOR VARIATION

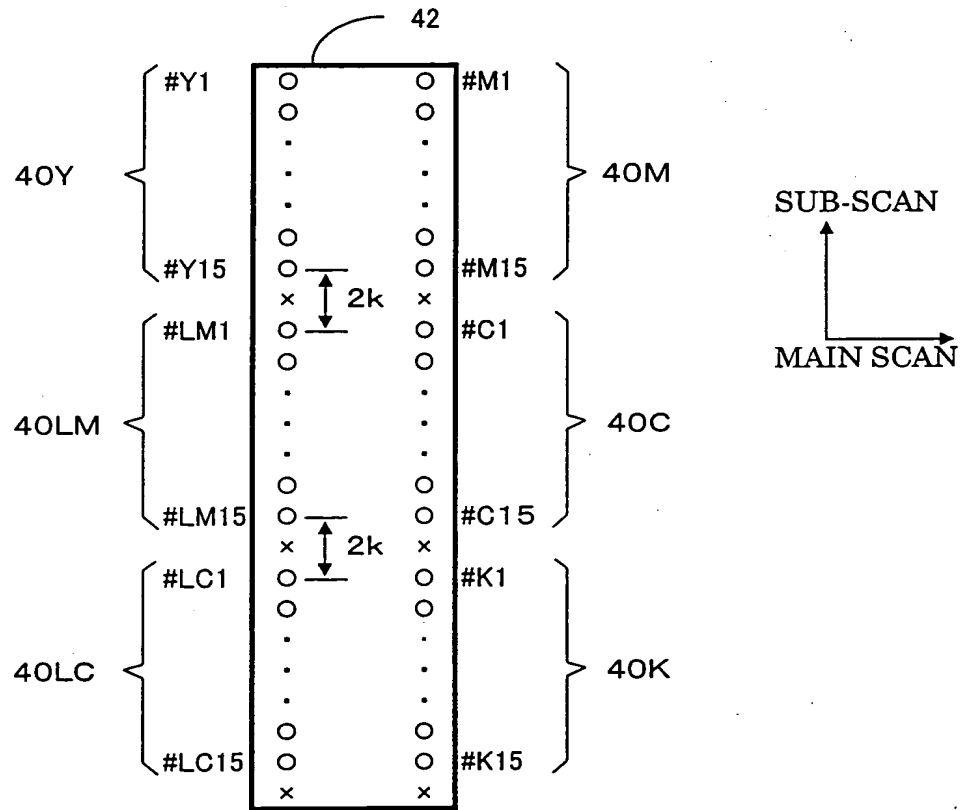


Fig. 19

THIRD ACTUATOR VARIATION

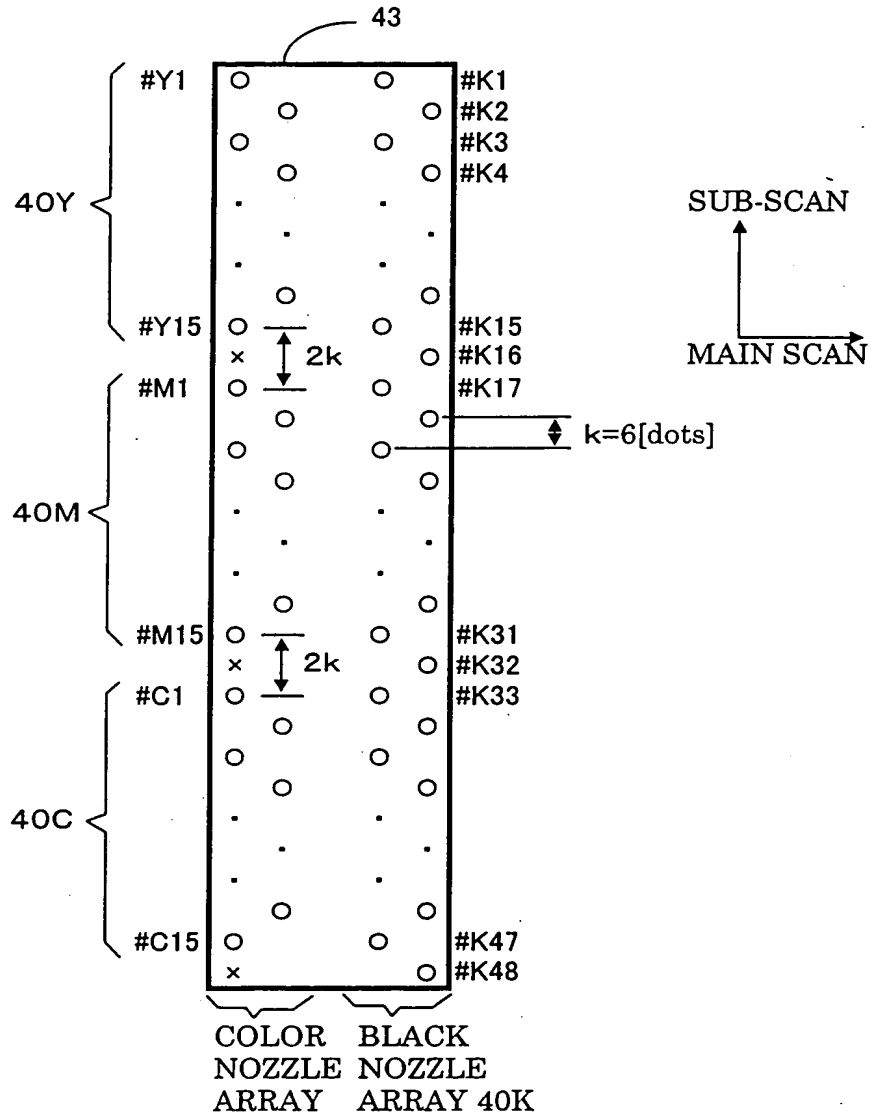


Fig. 20

FOURTH ACTUATOR VARIATION

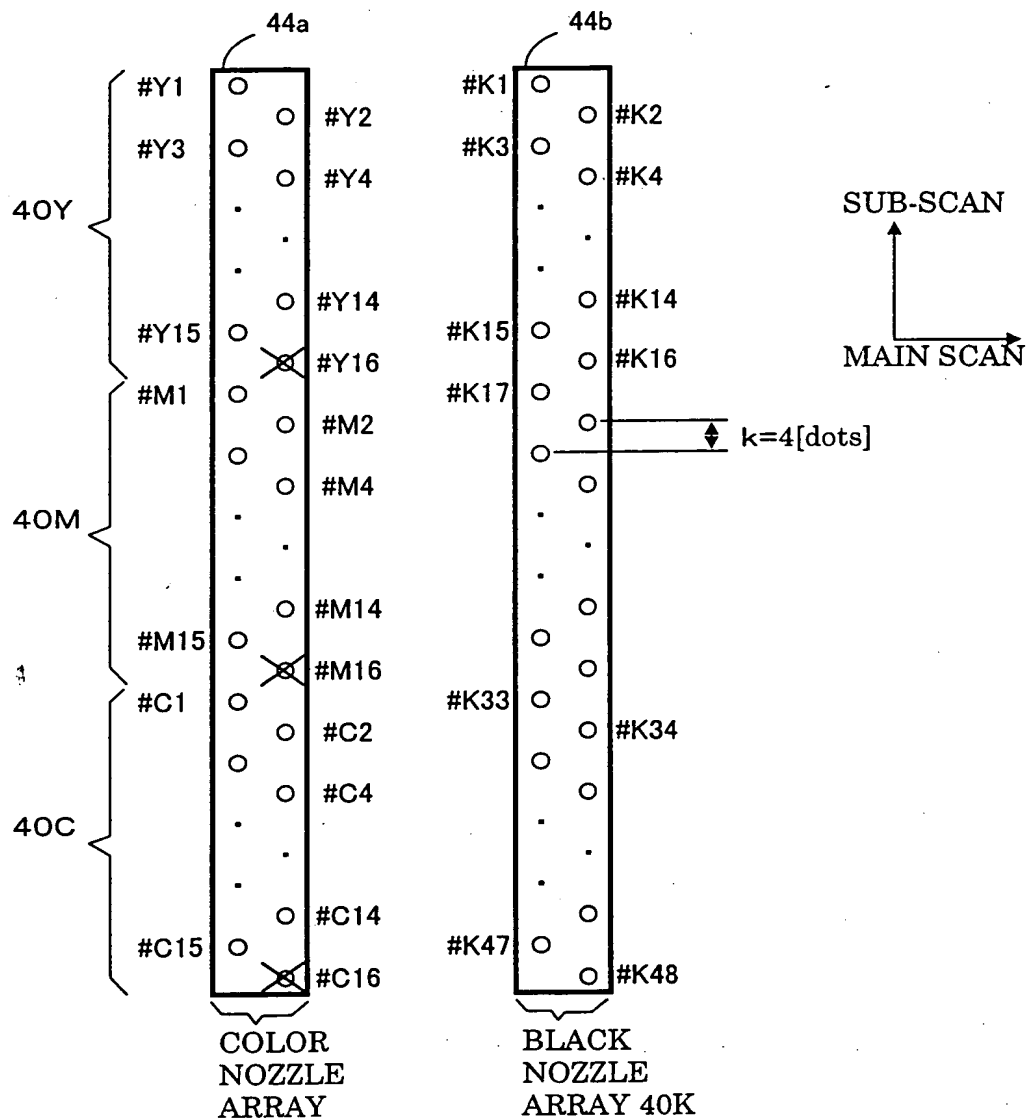


Fig. 21

FIFTH ACTUATOR VARIATION

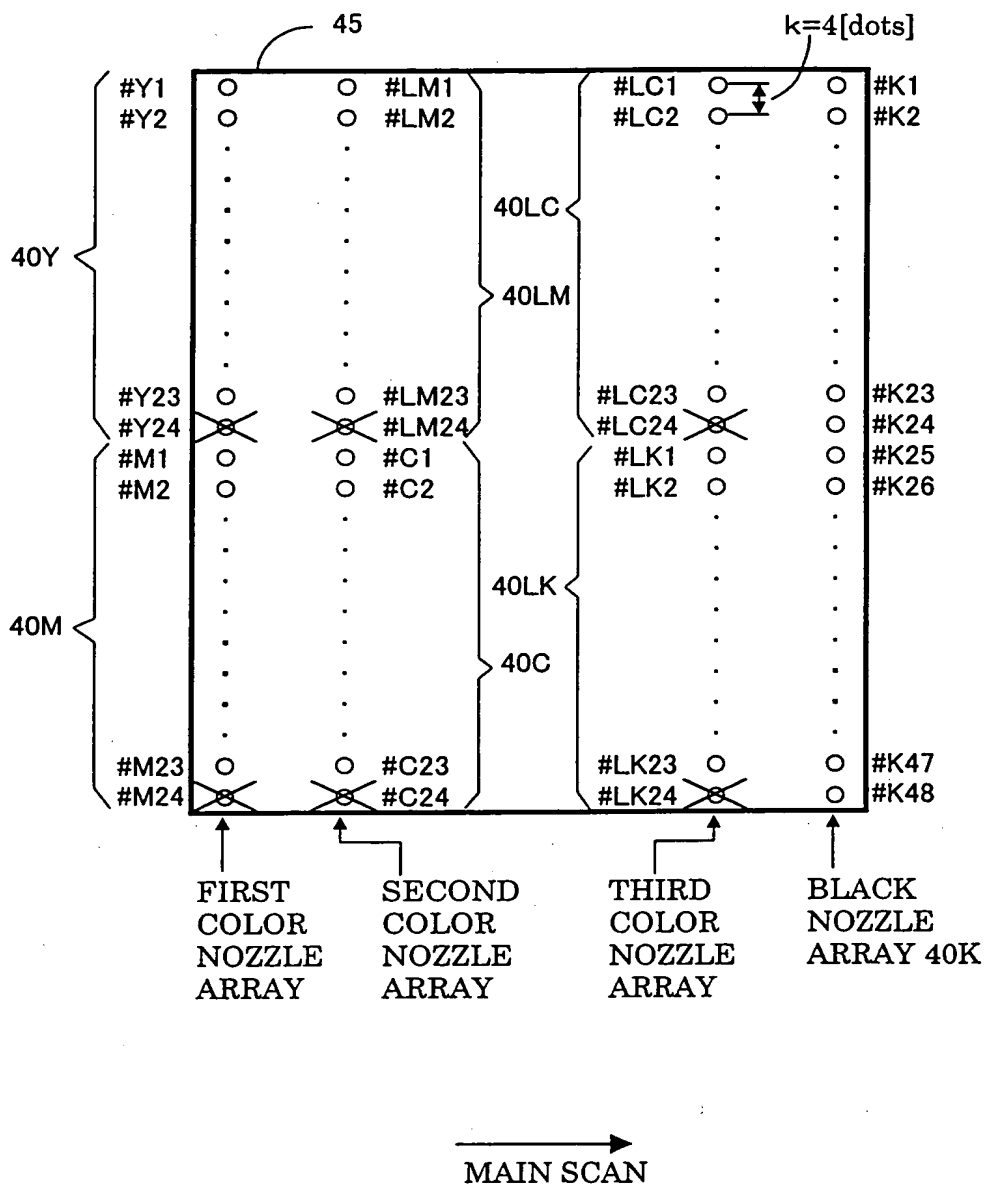
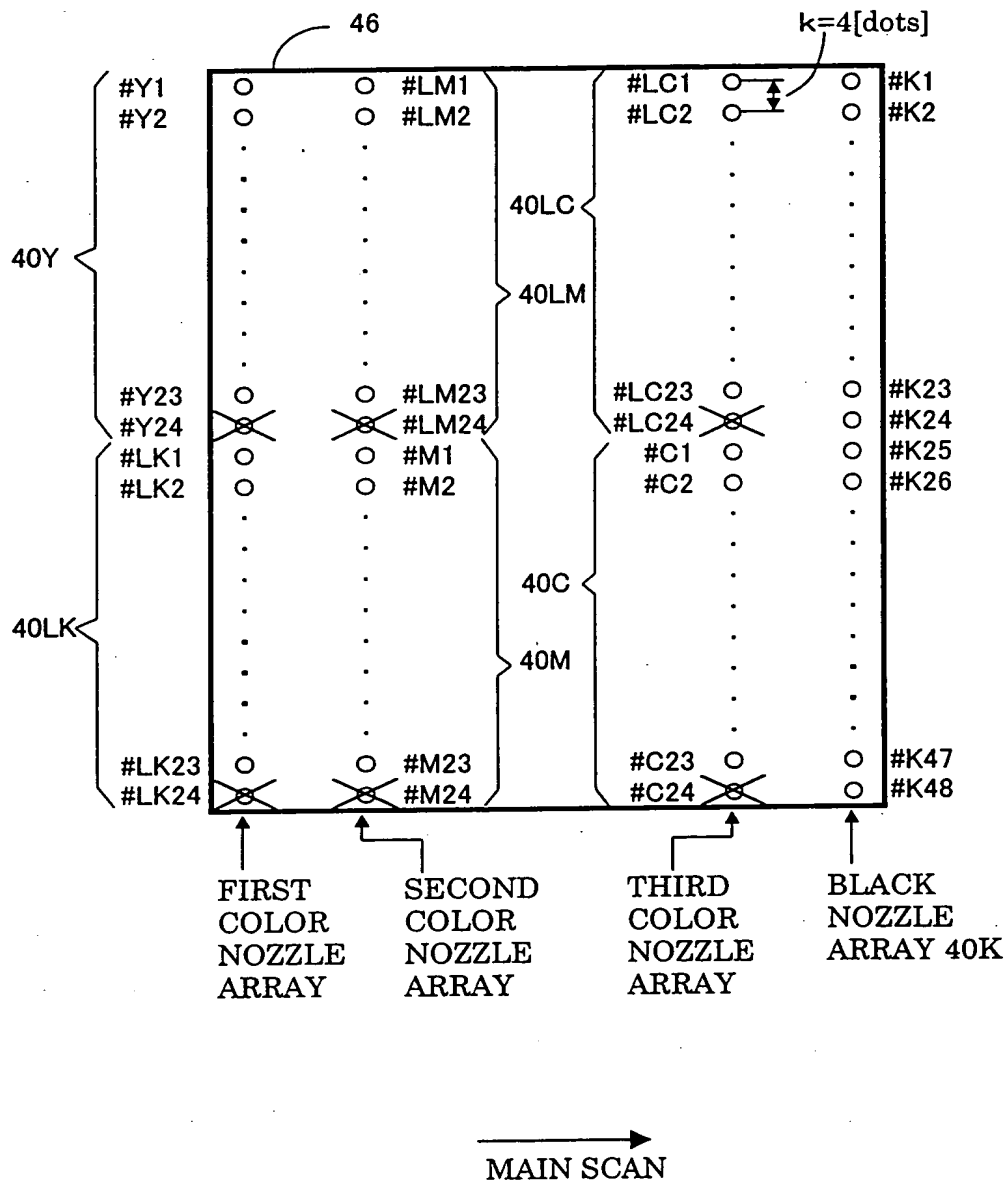


Fig. 22

SIXTH ACTUATOR VARIATION



## SEVENTH ACTUATOR VARIATION

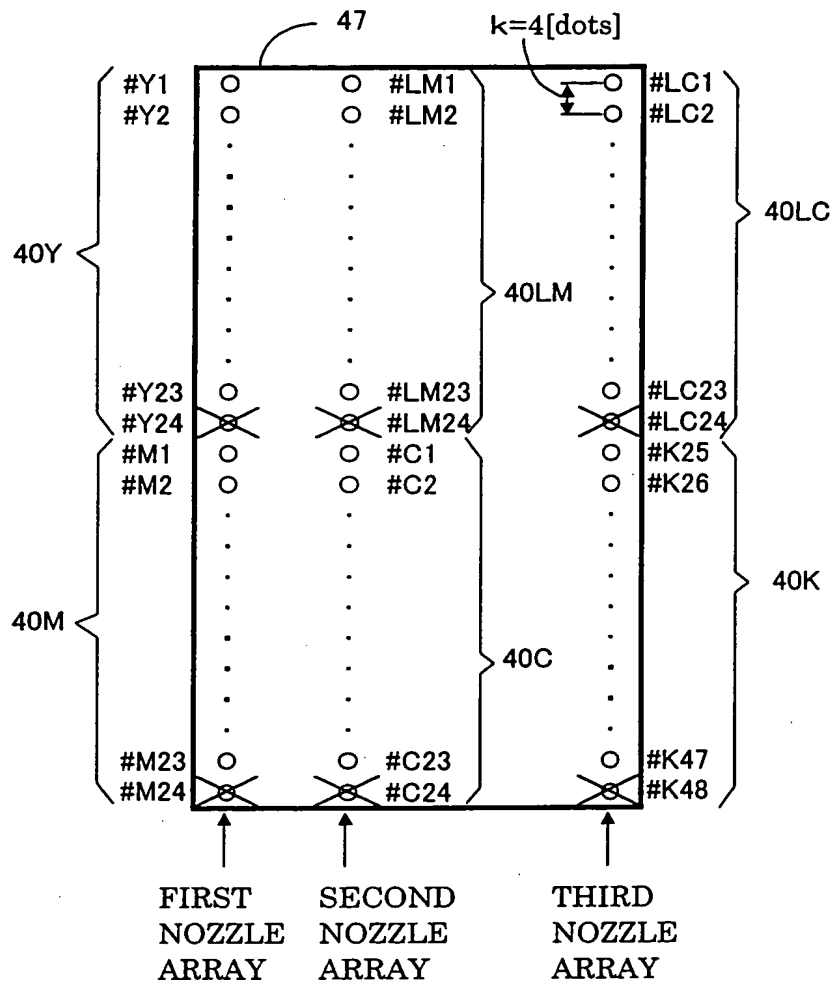


Fig. 24

EIGHTH ACTUATOR VARIATION

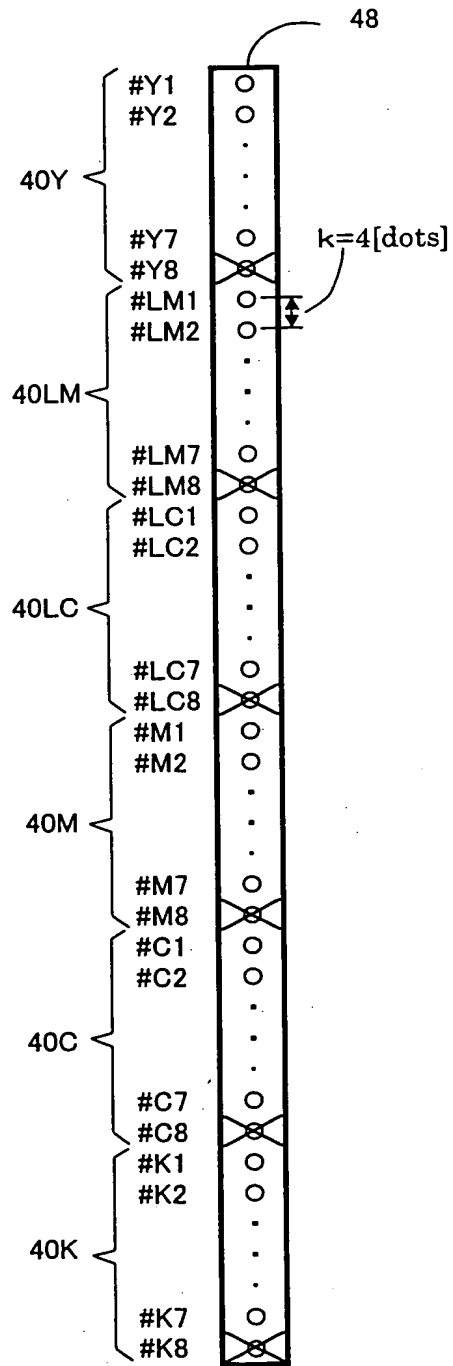




Fig. 25

INTERLACE SCHEME

NUMBER OF NOZZLES :  $N = 3$   
 NOZZLE PITCH :  $K = 2$  [DOTS]  
 NUMBER OF SCAN REPEATS :  $s = 1$   
 NOZZLE DENSITY :  $D$  [DOTS/INCH]  
 SUB-SCANNING PITCH :  $L$  [INCH]  
 DOT PITCH :  $W$  [INCH]

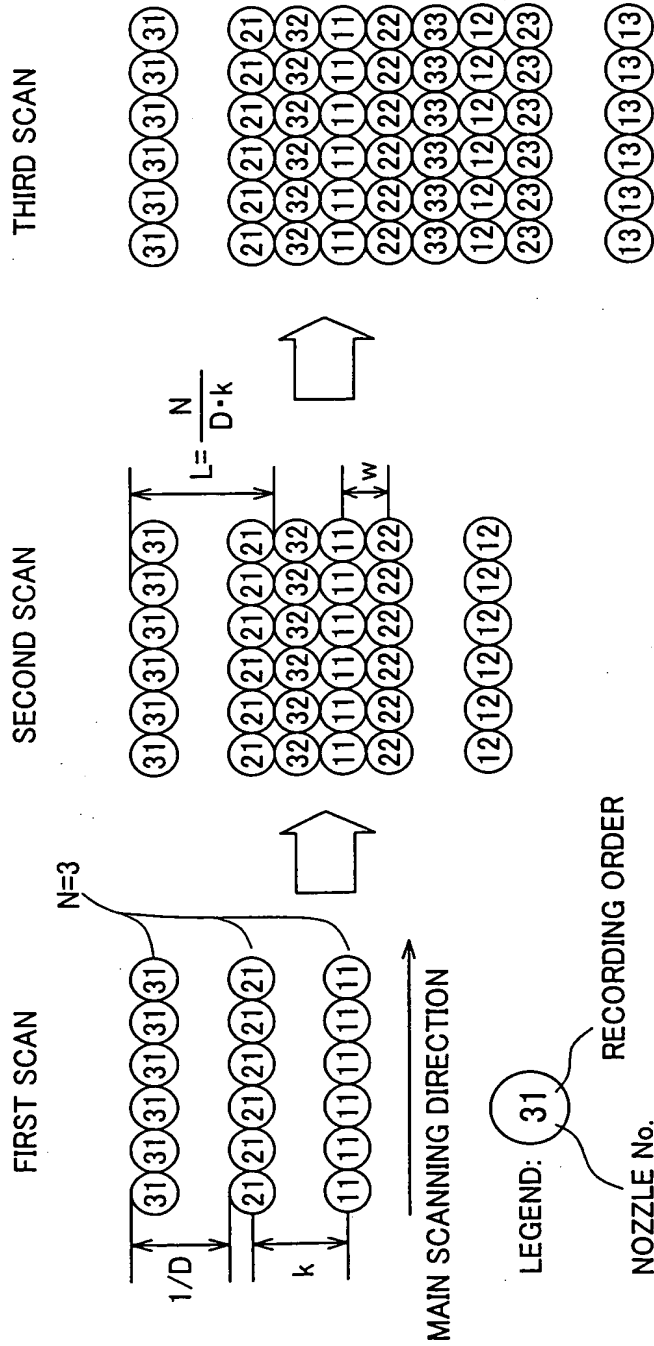
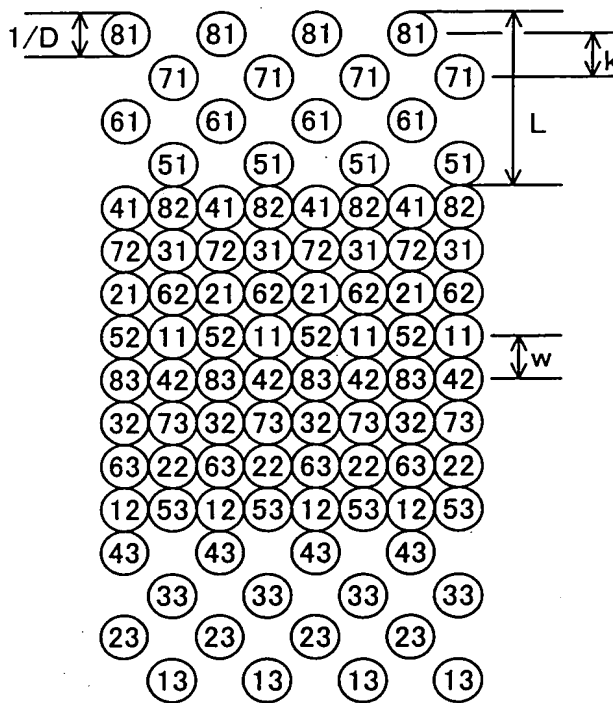


Fig. 26

OVERLAP SCHEME



NUMBER OF NOZZLES :  $N = 8$   
 NOZZLE PITCH :  $k = 1$  [DOTS]  
 NUMBER OF SCAN REPEATS :  $s = 2$   
 NOZZLE DENSITY :  $D$  [DOTS/INCH]  
 SUB-SCANNING PITCH :  $L$  [INCH]  
 DOT PITCH :  $w$  [INCH]

